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Lee's Lectures on Tanning - 1838

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LECTURES ON TANNING.

TWO LECTURES

ON

TANNING,

DELIVERED BEFORE

THE ECLECTIC FRATERNITY,

ON THE

7TH & 14TH FEBRUARY, 1838.

BY THE HON. GIDEON LEE.

NEW-YORK:

PUBLISHED BY THE ECLECTIC FRATERNITY.

1838.

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To the

Hon. GIDEON LEE:

Dear Sir—

At a regular meeting of the Eclectic Fraternity, held at their Rooms, on Monday evening, Feb. 19, the following resolution was unanimously adopted.

Resolved, "That a committee of three be appointed to wait upon the Hon. Gideon Lee, and request a copy of two Lectures, delivered by him, before the members and friends of this society, on the subject of Tanning, and that the said committee be, and are hereby authorized, to have the same published, should our request be granted."

In compliance with the above resolution, the undersigned committee respectfully solicit a copy of the Lectures referred to, believing you could in no way so effectually render a service to *that trade* in whose success you have so repeatedly manifested interest, as by complying with this request.

The committee have the honor to be,

Your obliged servants,

J. S. SCHULTZS,
EDWIN SMITH,
NICH'S CARROLL,
} *Committee.*

New-York, Feb 21, 1838.

New-York, Feb. 26, 1838.

Gentlemen—

I have received your letter of the 21st inst. communicating the request of the Eclectic Fraternity, for a copy of two Lectures, delivered by me before that association, on the subject of Tanning; and you have been pleased to express the opinion, that my compliance may render essential service to the trade in general: although I cannot flatter myself that any great good can be derived from those Lectures, I do cheerfully comply with your request, in the hope and the belief that the publication may induce others more competent, to examine, correct, and improve, my very imperfect efforts.

Very respectfully,

Your obedient servant,

GIDEON LEE.

To Messrs.
J. S. Schultzs,
Edwin Smith,
Nich's Carroll,
} *Committee.*

LECTURE I.

MR. PRESIDENT AND GENTLEMEN:

WHEN this society did me the courtesy to request me to give a lecture on the manufacture of leather, I accepted the invitation most willingly; not because I have the least pretension to the requisite qualifications of a public lecturer, or any superior skill or science, but, with a view to get together and embody the general knowledge of the whole trade; and, because of the great extent and usefulness of this branch of our American manufactures; and finally, because, during the forty years in which I have made it my principal business, my habits, thoughts, actions, passions, have so constantly dwelt upon it; and my pride, character, and pecuniary interests, have been so involved, so inseparably blended with its prosperity; I do confess I love to talk about it: and being now about to retire from the trade, I am pleased with the opportunity to communicate to my juniors, remaining in it, whatever little

knowledge my long practice may have enabled me to pick up. I do not know that I can say any thing new.

I am aware that the importance of the subject should have placed it in abler hands than mine; for beside my non-pretensions to science and literature, I have scarcely leisure, at this time, to put into form and order even the limited knowledge I do possess, still less to study scientific or learned terms and phrases; I must, therefore, merely endeavor to make my discourse intelligible, in my own homely style and manner.

It will doubtless surprise my young friends here, to be informed, that while books and pamphlets on other branches of American industry, which I deem greatly inferior to this, both in point of magnitude and usefulness, have been written and published, I have not been able to find any *American* work in print, on the *science or art of tanning*, from which to derive the information and aid I could have wished. I lately had a small pamphlet on the subject, written by a gentleman in Maryland, which I remember to have approved, but have mislaid it; and there may be other works extant, but I have not met with them. In this paucity of *American* authors, I have availed myself freely of *European* works; but the great

body of this lecture is derived from practical *American* tanners. We are the more surprised at this deficiency of *recorded* science, when we trace out the innumerable and indispensably important uses of leather in this country.

In point of necessity, few manufactures surpass it. Leather, indeed, seems to enter into the uses of every other trade, every family, every person; nor does it stop at the useful; a large portion of our ornamental furniture, equipage and dress, admit and require this commodity, in some one of its numerous forms. We see it the chief ornament of the splendid volume, as well as the preservative cover of the plain one; as well the gilded military cap and belt, as the rough and homely girdle of the coal-heaver's frock; in the President's gala-day and inaugural coach, and in the drayman's cart-harness; on the ploughman's team, and in the moving trains of the victors and the vanquished of the field of Waterloo; on our fire-engines; in our libraries, parlors, halls, stables, ships, and factories; witness the indispensable leather bands, communicating, from the great central power-wheel, its mobility to the thousand distant points of the ramified machinery. Whichever way we look, or move, we cannot fail to see this indispensable article in use.

It would reasonably be expected, that a manufacture so necessary to all mankind, so long in practice, so extensive in amount and value, should have been well understood in all its fundamental principles, for centuries past, as well *scientifically* as mechanically. The fact is not so! I cannot discover that any tolerably correct notion of *the philosophy of tanning* existed, until within the last forty years. The whole process of converting raw hide into leather was supposed to be merely mechanical. Chymical affinity, and chymical combination were not known, and but rarely suspected, in the formation of leather. The French chymists, about forty years ago, first discovered; and the English and American chymists have since confirmed the fact—that the formation of leather is distinctly chymical. It is now believed to be the chymical union of two distinct principles or elements; the one being the long known animal gelatine, which constitutes the body and substance of all raw hides and skins; the other, the more recently discovered vegetable substance, the identity of which was first ascertained and made known to the world by Deyeux, a French chymist, and by him named *tannin*.

Seguin, a notable tanner, as well as chymist, of the same nation, by great experimental labor,

separated and defined it, and established the truth of Deyeux's discovery.

It is the chymical union, or combination of this tannin, with the gelatine, or glue of the hide, that forms the insoluble substance which we call leather.

The manufacture of leather has probably suffered more, from the want of this knowledge, (and is still suffering, for I find few tanners now willing to admit a chymical combination, in its full extent,) than from all other hindering causes put together. The still prevailing idea is, (at least, with a large portion of the tanners,) that the tannin merely fills up the open pores of the hide, *as mechanically as the mason's mortar fills the interstices of a wall, or as the shoemaker's threads or pegs fill the awl-holes.*

I may remark here, that when a hide is freed from the hair, flesh, and other extraneous appendages, (which operation, as well as the labor of handling and finishing off, I need hardly say, are mechanical operations,) it is composed of unmingled gelatine, and the whole may be reduced to glue.

Many tanners have a mistaken notion that the glutin forms one portion, and the *fibres* another portion of the hide. The glue-makers, however, find the whole substance of the hide reducible to

glue, after the cleansing preparatory process I have already described, has been done.

I have said, that the process of the formation of leather, from the moment the prepared hide or skin comes in contact with the *ooze*, (the solution of tannin,) until it is perfect leather, is a purely chymical operation. It is the creation of a new substance, by means of the chymical union of two pre-existing elementary substances. The chymical affinity of these two elementary substances, when both are in a state of solution, or in a state of approximate solution; and the suddenness of the union, when no obstacles intervene, almost surpass description. In confirmation of this powerful affinity, it is related of one of the French experimenters, while the dispute ran high as to the predominance of the mechanical or chymical powers in this manufacture, that having prepared a warm solution of glue in one vessel, and a solution of tannin in another, and pouring the two into a third, he was thrown into ecstacies with the result, when the instant rising vapor carried to his olfactories the strong odor of leather.

It is believed that the chymical proportions of these elementary constituents, (pure glutin and pure tannin,) in forming such union, would naturally be about forty-six of tannin to fifty-four of

gelatine, both being in a state of solution. It would seem to be a fair corollary then, that if unequal quantities should be put together, equal quantities only would unite; and the excess of either would remain a separate residuum: and if this theory be correct; if nearly equal quantities be the ruling law of this chymical combination, it would seem another fair conclusion that each pound of perfectly dried hide should make nearly two pounds of leather; that is, it should incorporate or combine with itself nearly an equal weight of tannin. The question very naturally arises then, why do we not make nearly two hundred pounds of leather from one hundred pounds of clean, dried, raw hide, instead of one hundred and thirty to one hundred and fifty pounds, as now made; it being known by the glue-makers, and through them, by us, that all the *apparently* different component parts of raw hide, (the hair, flesh, &c. first cleaned away,) are in fact composed of pure glutin; and that the entire hide, when so cleaned, is reducable to glue? I find some difficulty in making the proper answer to this question, but it seems to me to be this, viz: that the hide is not, and may not be, in the manufacture of leather, as in the manufacture of glue, reduced to a state of solution. The purpose, or object, allows no more than an approximate solution, a mere softening.

I believe much of the original gelatine of all our hides and skins is never combined with the tannin, but is wasted, actually extinguished, or incapacitated, or perhaps both, in the process of the manufacture, and chiefly by the necessary tardiness of that process; for I have not a doubt, that if it were possible to bring every particle of the hide, the moment it is prepared for the handler, into conjunction with the tannin, as the chymists are able to do with their solution of both, the result would give nearly two hundred pounds (probably one hundred and eighty) of leather from one hundred pounds of perfectly dried hide, when cleaned of all extraneous appendages. But this being impracticable, as we must retain the original organic form of the hide, in order to make leather of it, it becomes our proper business to devise and adopt such saving modes of process as will waste the least, and save the greatest quantity of the gelatine substance of the hide.

I hardly know how to induce the continued attention of my audience on a subject so *husky*, so barren of entertainment, and withal, somewhat abstruse; having no flowers of rhetoric, no ornaments of elocution, no *ruffles*, no *prunello*, nothing in fact to present you with, but the rough, unseemly *material of our trade*, mere *tannin, glutin, and leather.*

Will you proceed with me, then, gentlemen, in this work? and let us make the most of it that our raw materials will possibly allow us to do; for, be assured, the whole *secret* of the manufacturer's profits, now-a-days, lies in his *savings*, not in his *makings*. Let us then waste nothing that we can possibly save. It is an axiom with me that economy is better than hard work.

I have expressed the opinion, that if we could bring the tannin into immediate contact with every part and particle of the prepared hide at once, interior and exterior, our gain in weight would be about eighty per cent.; and that, in the necessary delay during the several months process, a portion of the softened hide, which is kept in a state of *divorce* from the object of its strong and natural affinity, utterly goes to waste, or loses its capacity ever to unite with the tannin; or it imperceptibly becomes extinct. Some portion, however, and in some instances, a large proportion of this waste of gelatine occurs, in preparing the hide before it comes to the handler. I will notice this first.

Gentlemen will remember, that *saving is the order of the day;* and that each pound of glutin wasted, incapacitated, expunged, consumed, or otherwise lost, involves the loss, or prevents the gain of nearly an equal weight of tannin, which the glutin so lost would otherwise have combined.

I am satisfied that excessive soaking and softening is the incipient waste, and will relate an instance:—When Hubbard & Lee tanned for Mr. Lorillard, in 1804, '05, they erected a new water-power softening-mill, and being totally inexperienced and ignorant of its great power, and confiding too much in the obstinate hardness of the dry Laguira hides, they pushed the pounding of the tremendous iron shod beams upon the soft soaked hides to such a degree, upon several hundred of them, that in their opinion, then, and in my opinion, now, without inducing even incipient putrefaction; but by the mere force of those tremendous hammers, too long continued, they actually expunged a portion of the finer particles of the gelatine substance, which the softness of the water, in conjunction with the powerful action of the pressure of the *milling*, had reduced to a state of approximate solution. The workmen complained throughout the whole process of tanning, of those packs, of the "softness, limberness, and thinness of the sides." These bad characteristics might have arisen from other causes. We all know that the most fruitful source of erroneous conclusions, is, the attribution of certain known effects to the wrong causes; possibly so in this case: but I believe we then assigned the true cause. The leather weighed very light—the loss was something

to the owner; but the business was then very profitable, and that gentleman, (the owner,) whose liberal spirit would grieve less in *suffering* several questionable wrongs, than in *doing* a single positive one, claimed no damage.

But we must be equally careful to avoid the opposite extreme; for if our theory be correct, short, or deficient softening, is no less a cause of loss or waste than over-doing. The purest glue, and the purest tannin, have no more chymical affinity in a perfectly *dry* state, than the two most repellant substances in nature. It is only in a state of solution, or extreme softness approximating solution, that this affinity has active existence. Every ounce of the hide, therefore, which fails of that degree of softness requisite for the incorporation or union of the tannin is no better than lost; it can never form the necessary union with the tannin in order to make leather; but it must remain in a state, which, in technical phrase, we call "horn," or "starved hide."

Some tanners have fancied that the penetrating, distending, opening power of the lime, in the next stage of the process of preparation, may perform what the pure water and the softening mill have left undone. We know that lime is a powerful solvent, and in part it possibly may remedy the

defective work of the water and the mill, but not fully. Every good tanner knows this. If, then, ten pounds of hide in a hundred should fail of the requisite degree of softness, in the harder or thicker parts, the leather will fail proportionably, both in weight and quality.

It is probably known to every body, that the object and the operation of the tanner's lime-pit is chiefly to remove the hair, and the greasy or oily particles, from the hide.

I may, for a moment, dwell on the sharp and searching power of quick-lime, in contact with humid substances. The operation of a strong solution of lime, on the soft and raw hide, is powerful—opening the pores, agitating the fibres, and separating the component corpuscles—loosening the hair, consuming the fatty particles, and distending and swelling the whole body of the hide to the double of its natural thickness. It must be obvious to the most ordinary mind, that a menstruum so cogent should be used with great discretion; and I think we have good reason to apprehend, that a solvent which is known so rapidly to decompose dead animal bodies, has done great waste to our trade in consuming the soft gelatine of which the raw hide is composed. Every tanner knows that all high limed leather is loose,

porous, pervious to water, weighs light, and wears out quickly; but every tanner may not so readily perceive the critical process, by which the lime makes this havoc with our work. I ascribe the whole mischief in the process (and I think rightly) to the actual consumption of the soft and more delicate particles of the glutin. Let us suppose that ten pounds in the hundred are thus consumed! Why, we have not only lost the ten pounds of hide, but we have failed to gain the five, or seven, or ten pounds of tannin, which should have combined with it! It will be remembered, that I have assumed—not without authority—that the natural capacity for chymical union, of the two great elements of leather, is nearly equal quantities, nearly pound for pound. No workman, therefore, who does not possess a sound mind, good discretion, and vigilant disposition, should be put in charge of this department of the tannery—the liming.

I shall say but little of another process adopted by a great number of our large tanners within a few years, commonly called *sweating;* which accomplishes, by the process of that *fermentation* natural to all dead animal substances, all the beneficial purposes of the lime; and, I am inclined to believe, with less waste of the raw material: but, as I have had no practical experience, and but

little personal observation, in this newly adopted process, although it is no new invention, having been long in practice in Europe and in our middle states, and was doubtless the universal practice in the infancy of tanning, before the art of liming was known, I will merely and most briefly repeat the information given me by several practical tanners, in whose judgment I have much confidence. They say, that the sweating process, in comparison with liming, "requires less labor, saves a portion of the hides, which, in the process of incipient putrefaction, would be suddenly destroyed by lime, causes a greater gain in the weight of the leather; that it is more solid, finer texture, less pervious to water, and wears longer; but requires longer time in the tanning, and is very difficult for the shoe maker to sew or stitch."

The process called *bating*, which immediately follows the liming, and which is intended to extract or expunge it, (the lime,) and restore the texture of the hide, as nearly as may be, to what it was before it entered the liming process, is, in its nature, that kind of fermentation which immediately precedes putrefaction, and the ultimate decomposition of all animal substances.

This is perhaps the most delicate and critical operation in the whole range of the manufacture

of leather, and requires in the operator the nicest perception, the most improved judgment, and constant watchfulness, especially in variable weather. The great difficulty lies in determining that precise point of time when all the lime is expunged, and when actual putrefaction is about to begin.

The next process is the *handling*. Here begins the actual tanning. The handler is a solution of tannin, which, being a powerful anti-putrescent, instantly arrests the fermentation generated in the bate. It also arrests putrefaction in case the hide has arrived at that stage of decay. I have good reason to believe, that in the *bating* process a large portion of the substantive body of the hide may be "run off," without destroying its organic structure. I presume every reflecting tanner will support me in the opinion, that the waste of glutin, in over-bating, is very great. I cannot too often repeat, that the apparent loss of glutin, in whatever stage, is but little more than half the real loss ultimately incurred by the owner; but I have good reason to fear that a greater loss is incurred, by means of the *tardy* application of the tannin, from the first handler to the last layer, than by all other wasting causes together.

I have noticed the results of numerous experiments of both *slow* and *quick* tanning; and in all cases, (the preparation of the hide for the ooze

being equally well done,) have found the *quick* tanned specimens of a firmer and closer texture, more solid, less pervious, vastly greater weight, and far more durable in the wear, than the slow tanned specimens.

As no very definite idea of time is conveyed by the words *quick* and *slow*, I desire to explain.

By *quick tanning*, I mean three to four months for light sole leather; five to six months for middling; and seven to eight months for very heavy; dating from the first handler.

By *slow tanning*, I mean any considerable additional time to the terms named.

I believe a much quicker process might be had, that would give as great or greater weight; but it would render the leather too hard and harsh in its texture to be conveniently worked up by the shoemaker. It will be observed, I am speaking of *sole* leather only, with which kind I am most intimate. The proper terms of time for tanning all other kinds, whose uses require more suppleness, pliability, and *toughness*, I leave to the judgment of those who have more experience about them.

The ordinary increase of weight among the large tanners of this state, on the *unsalted dry* hides, imported from Laguira, Angostura, Buenos Ayres, Rio Grande, and other parts of South America, (and such chiefly make up their stocks,)

is from forty to fifty pounds per cent. That is, each hundred pounds of *dry* hide makes one hundred and forty to one hundred and fifty pounds of dry sole leather; and in cases of extraordinary exertion, through the excitement of emulation, premiums and the like, sixty to sixty-five per cent. gain has been made. Our theory of chymical union is strongly sustained by these data. What other substance could supply this increased weight but tannin? And how is this greater increase, in all cases of greater exertion, derived, but from the greater care used in staying the waste of the glutin in all the stages of manufacture? This greater care is, the prevention of waste in the *soak* and *mill*, in the *lime*, in the *bate*, and in the *ooze*. I will remark here, though I may have done so before, that the wear and the worth of the leather, is always in the mathematical or approximate ratio of *increased* weight. I may also repeat here, that when all the glutin composing the hide is entirely combined (saturated) with the tannin; when the union is perfectly formed; not a single additional ounce can be gained from the strongest ooze, whatever time you continue the process. I have a most satisfactory experimental proof of the correctness of this conclusion.

I consider active and long continued handling vastly important; not only in the acquisition of

weight, but in point of firmness and durability. I would handle sole leather from eighty to one hundred and twenty days, according to the weight of the sides, and the subsequent *laying away* should be short and frequently repeated; a few days only for each layer, and in no case more than two-thirds the quantity of sides which is usually laid in each vat.

I have ascribed the greatest loss or waste of glutin to the *tardiness* of the *tanning* stage of the manufacture. I am not able to satisfy my own mind precisely how or where it goes; I am rather inclined to think it does not separate and escape from the body of the hide, as in the process of softening and bating; but for want of an immediate conjunction with the tannin, I believe it somehow perishes, and becomes extinct in its original position, or becomes incapacitated ever thereafter to form the necessary union with the tannin. If these conjectures be well founded then, much handling will prove the best remedy.

I take it the glutin of the interior parts of the hide, chiefly suffers this disqualification; for, the exterior being brought into immediate contact with the tannin, the two surfaces are always first tanned, as every body knows. This is seen by cutting into a side from month to month, during the process, in one part, say the butt. And it is some-

what curious to see the progress of the combination extending from the two surfaces inward—the interior remaining colorless, soft, raw hide, for months after the two surfaces have become firm, well tanned leather; the glutin of the two surfaces having arrested and combined all the tannin, before it reaches the interior.

Every tanner knows how slow the progress towards the close of the tanning process, compared with its rapidity in the beginning, and especially so, on long heavy layers. It is very clear, at first view, why it should be so; indeed, we almost wonder how the interior of a thick hide gets tanned at all. The two surfaces have become leather, and therefore difficult for the ooze to pass through them into the interior; and next, the pressure of its own weight, a ton or more, *en masse*, of sixty to a hundred sides of laid away leather, closes up all the interstices or passages of entrance for the ooze into the interior mass. And, again, the quiescent condition of the whole contents of the vat, fluid and solid, is unfavorable to the passage of the ooze into the hide.

If it is the great ruling law of all inanimate bodies, whether fluids or solids, to remain for ever at rest, unless some impulsive power puts them in motion—(Every person knows this of dry solids)—

If it is equally true of fluids, though not so readily visible to the mind which has chiefly witnessed moving waters, running streams, the ebbings and flowing of the tide, and the like; it would doubtless be an amusing experiment to such, to place a small open vessel of colored fluid into a larger vessel of common water, gently, without agitating either, and witness the utter inability of either to mingle with the other. Now, I understand, that the different portions of a body of fluid have little if any more disposition, tendency, or power, to mingle with other portions of the same body, though in juxta-position or contact, so long as such whole body of fluid remains perfectly quiescent, than have the different portions of a solid body, wood or marble, to move, change place, and mingle with other portions of the same block of wood or marble. Thus it is with the ooze; it has no power of self-mobility; and, as that portion which has already entered the hide, filling every pore, and filling the entire body of the hide to its utmost capacity to receive—probably about one to two gallons: also that portion of the ooze which falls into juxta-position, is presently exhausted of all the tannin it held; the process of combination, or tanning, therefore, presently stops, and cannot resume until you *plunge up the liquor*, and bring

the unexhausted portions into actual contact with the glutin. I know it has been held by some, myself among them, that the chymical affinity, or attraction of tannin and glutin, is so strong as to give them, when in a proper condition, a self-moving power towards each other. I now believe this cannot be. Again, the viscous or *sticky* nature of the tannin is a hindrance to its free entrance. And again, if we pump out or run off the exhausted ooze from packs of laid away leather, and run on a new strong liquor, which some tanners have been in the practice of doing, it is but a partial remedy, as it can pass but tardily into the interior of the inert mass of sides; and still more slowly into the interior untanned glutin of each side, through the already saturated, clogged, and almost impervious surfaces. Now, I think active handling is the proper and only remedy for all these difficulties. First, in handling, we may recruit the ooze daily, or as often as exhausted. Second, the action of handling the sides daily, out of and into the vats, the change of positions, the bending and unbending, the folding and unfolding, the piling and unpiling, so moves and changes the position of each portion of the side in relation to all portions of it, and so breaks up or loosens the component texture, and reopens the pores—and

what is more effective still, the spent ooze is expunged or drained out from the hides by the pressure of the weight of the pile when hauled up; every particle of the tannin this spent ooze did contain, when it entered the porous hide having been combined with the hungry, absorbing glutin, remains now a dead impediment in the hide, to the entrance of the fresh ooze, forming a complete barrier—I may say *dam*, to the entrance of any fresh ooze; this dead ooze, therefore, must be expunged somehow; the new ooze, in a state of rest cannot remove it.* I say, then, this operation of handling is the remedy; and the only preventive of poor, soft, light starved leather; and I strongly suspect that nearly all the progress made in laid away packs, is made in the first few days after the act of laying away.

I consider the time of your twenty and thirty day layers, in a measure, as lost time; and we must not forget, that in every day's delay, the softened,

* It has been supposed, that even the atmosphere, which takes the place of the expunged fluid, in the hide, forms a barrier, in some degree, to the entrance of the new ooze; and the principle of the the *vacuum* or *exhausted receiver* has been applied to the tan-vat as a remedy. The morocco-dressers have resorted to the principle of *pressure* on their skins, while in the process of tanning, with great effect, in expunging both air and spent ooze; but my information on this subject, and particularly the principle of the exhausted receiver, is too limited to express any opinion about its practicable application on a large scale.

prepared, hungry glutin, is irrecoverably perishing or disqualifying, for lack of its proper sustaining aliment. The only objection I have heard to this system of continued, persevering handling, is the cost of the labor; and I freely admit that the labor of handling up a stock of ten thousand sides, for one hundred and twenty days in succession, in a country like ours, where the cost of labor is some two or three fold greater than that of Europe, and tenfold greater than the labor of Asia, is a serious objection, but I cannot but hope it will be met and overcome. The labor-saving machinery already in use in our large tanneries, by the best computation I am able to make, has lessened our actual manual labor more than thirty per cent. compared with that of forty years ago, or compared with the *manual labor bestowed in the European tanneries at the present time;* and as our *tannin material* costs so much less than that of the tanners of Europe, we have nothing to fear from competition in that quarter, even should we add one-fourth to the labor we now bestow on each stock.

To save this labor of handling, one of the projects of recent origin, suspends the sides in large deep vats; each side attached by hooks to a revolving wheel, quite enveloped in the ooze, in such a manner, that with each revolution, every side is

freely moved, but without being raised out of the liquor. I think this mode is defective. I deem the daily drainage or *expunction* of the exhausted ooze indispensable; and this cannot be efficiently done, without raising the sides out of the liquor, and piling, or otherwise pressing them. I hope the inventor will be able yet to remedy this obvious imperfection; or that some other plan of handling, by means of machinery, will be discovered, to obviate this defect.

I have often cautioned our tanners against injudicious and ill-timed *skiving*. It may not be necessary now, as I understand that this part of the work is greatly reformed, but it can do no harm to repeat the caution.

Injudicious, or ill-timed skiving, has done much mischief formerly. If performed in an early stage of the tanning, and skived deep, the leather never can be made plump, thick, or heavy. The lime, or the bate, or the ooze, or perhaps all three in their turns, so act upon the raw, skived surface, as to harden or crisp it. Early skived leather never swells, and always weighs light; and besides this *ill timed* skiving, nine tanners in ten skive too deep; and worst of all, deeper in one place than another, on the same side. I understand there is, of modern invention, a jagged kind of hackle

knife, for breaking up that impervious skin or texture which overspreads the whole inner surface of the hide, and which seems to be formed of the infinitely ramified termini of the diagonal fibres. I would therefore advise to discontinue altogether the use of the sharp edged knife, and use only this new invention.

The finishing operation, to fit the *sole leather* for market, and for use, is the *rolling*. This is done, in our large tanneries, by means of a solid metallic cylinder, passing over the grain surface, moved rotarily by hydraulic power, and with such weight and force as to give the leather a degree of solidity incomparably superior to any method ever known, and which greatly enhances its intrinsic value. This operation, as well as several others in our trade, requires a good genius to perform it well. The difficulty lies chiefly in *tempering* the leather judiciously. If too damp, or too dry, the great purpose of rolling fails, and few minds are able to determine that proper temperament. The difficulty is very similar to those of the softening, liming, and bating. I think it is the great metaphysician Locke, who says, *that of the whole range of human knowledge, that of the essential innate qualities of substances, is most difficult to attain. Number, figure, color, dimension, &c. &c. is readily*

discerned by the ordinary mind, but the component texture of substances is hardly ascertained or comprehended by the most extraordinary minds. The science of tanning, therefore, which not only deals in natural substances, but whose chief purpose is to make a new one out of those, is infinitely more difficult for the operator than the performance of a merely mechanical trade.*

* The knowledge of these truths, on the part of the large tanners of this state, probably led them, more than any other cause, years ago, to exclude ardent spirits totally from their factories, and from their stores. They learned, from practical observation, what Locke discerned from philosophy, that the keenest perceptions, the most vigorous mind, and the soundest judgment, were absolutely requisite to judge of and determine the constantly varying "qualities of the substances" on which their labor was performed; and that even moderate drinking disqualified the mind for the nicer portions of the work.

LECTURE II.

MR. PRESIDENT AND GENTLEMEN:

IT will be remembered by those who were present at my former lecture, that I spoke of the importance of this branch of our national manufacture, and touching slightly on the properties of *tannin*, passed over it, and dwelt chiefly on the work and *actual process* of tanning.

I propose this evening to resume my dissertation on the *tanning material*, which is so abundant in the forests of our country, but which forms a large item of the cost of leather in all countries; and if time will permit, give some comparative statistical views, embracing some commercial and financial data connected with the general subject.

I am aware, that statistical data alone, however correct, can perform nothing—the work of the tannery must be done by the combined action of machine power and manual labor. I am aware, too, that all paper calculations are liable to error. At the same time, we should not repudiate statistics; I think they may be made greatly beneficial

to the manufacturer; not as exclusive guides—not as his master; but as auxiliary aids, in conjunction with his own common sense and practical experience.

I stated, on the occasion before named, that most sorts of vegetable productions contained tannin, but in very unequal quantities, and cited the ascertained differences in several species of barks, leaves, &c. I may this evening find it necessary to repeat something of my former discourse, as I have not given that attention to order or method which I ought to have done.

I am not able, nor is it to my present purpose, to give a learned dissertation on the various medical powers and properties which some medical men have ascribed to tannin. Most chymists agree that it is a distinct principle or essence, and its identity as distinctly marked as that of gold, or gelatine, or farina, or saccharine matter. One of the inseparable marks of its identity is astringency, and yet astringency does not always indicate the presence of tannin; many substances being found powerfully astringent, without a particle of tannin. It is found in most or all vegetable productions, and for the reason before named you will allow me to trace it at some length. Several chymists have nearly agreed with each

other in the following experiments and results in extracting tannin, viz:

From Nut-galls,	about	26	per cent.	pure tannin.
" Souchong tea,	"	11	"	"
" Green "	"	$9\frac{2}{16}$	"	"
" Sumach leaves	"	18	"	"
" Willow bark,	"	$2\frac{5}{10}$	"	"
" Hemlock "	"	11	"	"
" Oak "	"	$6\frac{6}{10}$	"	"
" Chestnut "	"	5	"	"
" Elm "	"	3	"	"

It should be remarked here, that the quantity of tannin in the different specimens of the same species of plant or tree is found to vary greatly in different climates and soils.

The drug called catechu or terra japonica, yields about fifty-four and a half per cent. of tannin; but I understand this drug has already been concentrated from an Indian wood, which, in its crude state, may perhaps not yield half so much. Other chemists fancy they have discovered tannin in numerous carbonaceous substances, in fossil coal, in charcoal, in peat, in oil, and in other animal substances. A patent was taken out about thirty years ago in England, for tanning with *minerals*, but never having been used, or now being disused, it very obviously was one of those unreal discove-

ries wherein the imagination misled the judgment, or, perhaps, wherein cupidity, or desire of gain, misled the integrity of the patentee. Perhaps we should not discourage further experiments for the discovery of tannin in other substances, but considering that the cost of tanner's bark, in England, has been from six to sixteen pounds sterling per ton, for many years, and that all experiments to substitute minerals, and other fossils, have failed, in that "country of economy, calculation and thrift," I think we can hardly hope ever to find tannin out of the vegetable kingdom. I think, too, the barks and leaves now in general use, furnish the greatest quantity of tannin for the least cost of labor or money, of any that will be found hereafter.

That indefatigable and most skilful chymist, Professor Silliman, whose mind seems bent on "leaving the world better than he found it," some years ago experimented largely on chestnut *wood* in reference to the tannin it might contain. I have not the details of his experiments; I have had, however, several specimens (small slips) of the leather he tanned, and have no doubt the tannin from that wood was as good as that from the barks or leaves in general use; but I am informed by several tanners who have since used the chestnut

wood, (some of them on a large scale,) that they found it more costly than the hemlock or oak bark. I have no doubt the wood of all trees contains a slight degree of tannin, whose bark yields it, but in smaller quantities, and only in the exterior grains in contact with or near the bark.

As respects the *essence* of tannin, I am not able to perceive any variety. Pure tannin must be the same, whether extracted from the oak, the catechu, the hemlock, the elm, or other vegetable substances; but it is very clear, that other extractive matters, existing in the several vegetable substances, aside from, or combined with the tannin, and differing materially in different woods and plants, may enter into the hide with the tannin, and deteriorate as well the quality as the color of the leather. Hence, perhaps, we see hemlock tanned leather more hard, and the texture more rigid; and oak tanned leather more supple and elastic; these different qualities in the leather arising from the discrepant, perhaps, the opposite nature of the extractive matters in the two kinds of bark, while the tannin is precisely the same in both.

It may not be universally known, that the ross of bark, which was formerly separated and burned, or cast away as worthless, is now known to contain a moderate quantity of tannin—especially the ross of the hemlock.

The barks used in this country, are the oak, the hemlock, the bay, the ash, the birch, beach, &c. The oak and hemlock are chiefly used, being more easily obtained, and containing more tannin than either of the other kinds, the bay perhaps excepted. That the barks of warm climates should afford more tannin than those of cold, accords so well with the general laws of nature, in the production of vegetable essences, the fact need hardly be mentioned. I am not able to give the precise differences of what we commonly call " the strength" of bark, produced in the various regions of our country; but am not much in error when I say the oak of the lower and warmer parts of the middle states contains fifty per cent. more tannin than that of the mountainous and colder regions of the same states. The oak bark of the state of Delaware, and that part of New-Jersey opposite Delaware, is believed to contain full one hundred per cent. more tannin than the oak bark of the Northern districts of the states of New-York and Massachusetts; and, the oak bark, in the cold snowy regions of the green mountains, is said to have no tannin whatever, and little astringency. I am informed by tanners who reside in the North and Western parts of this state, that some of their oak bark is almost free from tannin; and the oak of all our North-western states has far less tannin

than the Atlantic oak in the same latitudes. I have seen and sold a pack of leather, the tanning of which was attempted with beach bark, but so deficient in tannin is that bark, the tanner told me he was obliged to use strong hemlock liquors to save the hides from putrefaction. I believe the beach tree is rarely found, but in cold regions, in any abundance. The birch bark of the green mountains, and probably of all other Northern or very high mountains, yields little or no tannin, although it has been used and highly esteemed; but being always mixed with hemlock or oak, or other bark, its defects were not discovered by those who used it. Some twenty-five or thirty years ago, a tanner of my acquaintance, in the region of the green mountains, desiring to make the experiment, used the birch alone, unmixed with any other, but presently found it had not sufficient tannin to prevent putrefaction. The hemlock bark is mainly used in all the Northern regions of this country; but I am not aware of this tree being found, in any quantity, available for tanning purposes, in any latitude South of New-York city. It is observable, that in this country, wherever the hemlock forests terminate, in regions too warm for its production, there the oak forests commence. The oak is therefore used in the mid-

dle states, and in the warmer parts of the Northern states; and the bay bark is chiefly used in the extreme Southern states—not because the oak is absent or deficient in tannin, in those states, but that the bay tree is much more easy to fell and peel, and its bark strongly impregnated with tannin, I think more so than oak.

The cost of bark, in England, for tanning one pound of leather, is from six to eight cents. The cost of bark (oak) in this country, in the crude state, for tanning one pound of leather, is from three to four cents; the cost of hemlock in the crude state, for tanning one pound of leather, does not exceed one and a half cents—probably one and a quarter cents may be the average cost for hemlock.

I have already noted a difference of quality in the oak and hemlock tanned leather; the former more soft and supple, the latter more hard and rigid. All sorts of upper leather, as well as saddle, bridle, harness, hose, belt, and band leather; also, skins of all kinds, should be tanned with oak or sumach, as suppleness is an essential quality in the uses and purposes to which these kinds of leather are put. The application of this theory of *the different qualities of the two kinds of bark*, has established the opinion almost universally—and I think erroneousnesly—that oak tanned sole

leather is better, and must ever continue to be, better than hemlock; and the former has been, from my earliest remembrance until quite lately, valued and sold three to four cents a pound higher than the latter. This difference of price still exists as to the lighter kinds of leather, for the finer uses; while, for all ordinary work, the heavy and common hemlock sole leather is now valued and sells about as high as the heavy and common oak. It would have cost a man *his whole leather reputation,* twenty years ago, to express the opinion against the sense of the world, *that quite as good sole leather may be made with hemlock as with oak tannin,* and at this date it may be hazardous. I desire, therefore, to admit here, that the prejudice against hemlock tanned sole leather, formerly, was founded in truth; the estimated difference in quality, thirty years ago, and the difference in the market value, of the two kinds, was real. Nearly all, or a large portion of the hemlock leather, up to 1820 or 1825, was miserably poor; arising not from any defect in the quality of the tannin of that bark, but from the miserable, defective, and unskilful system of manufacturing, throughout the entire hemlock region. I have dwelt longer on this point than it would seem to merit; because the hemlock does, and must continue to supply nine-

tenths of the tanneries of this state; and because this state is manufacturing largely for all the states of the union, and will doubtless continue so to do; and feeling confident that our modern improvements of the quality have made our leather quite as good as the average quality of that of the other states, and much better than some of them, I desire to remove, if possible, the remaining prejudice which I find still existing in several of the states against it, especially from those states whose necessities require them to purchase largely from us, and to supply whom it is largely our interest.

If hardness and solidity be a requisite quality for sole leather, as suppleness and flexibility are admitted to be for other kinds of leather, then it would seem that hemlock tannin should be the best for sole leather. I believe the best sole leather made in the world, during the eighteenth century, was in the large tanneries in Europe, near the river Rhine, and in England. The best made in this country was in the region of the Delaware river, and particularly in Philadelphia, and by tanners either from Germany or England; or by natives, who had learned the art from those, and were therefore skilful workmen; whereas the tanners of our hemlock districts, generally, have never understood

the art of tanning well with any bark, or any materials, until within the present century. Hence, in my apprehension, has chiefly arisen the superior credit of oak tanned sole leather over hemlock; but I must be permitted to say, however hazardous it may be, that most of the large tanners, in our hemlock woods, are now, at least as skilful and as perfect as any other tanners elsewhere; and I believe much of their leather now in this market, is equal in solidity, imperviousness and durability, to any oak tanned sole leather, wherever it may have been tanned.

Various attempts have been made in our inexhaustible hemlock woods, where bark is but two dollars a cord, to extract the tannin, to concentrate and diminish the bulk, so as to render the transportation convenient and cheap, to those older settled districts of our country where bark is six to ten dollars a cord; also, for exportation to Europe, where bark is still much higher. The tannin thus extracted, has been used by many tanners, and found to answer as well as the bark in its crude state; but, I apprehend, that so far as this country is concerned, the transportation of the hides to the hemlock districts, will be found to cost much less than the process of extraction, and transportation of the tannin to the hides. I should have no doubt of the

successful exportation of this extract, could we remove the inveterate prejudice of the European tanners against the coloring matter, which hitherto we find inseparable from it.

The time allotted me will not permit a detailed description of the improvements made within the last thirty years, in the construction of tanneries;* the labor-saving machinery; the new forms, modes and uses of hydraulics and water-power, brought into general use, among the numerous tanneries in this state; the application of steam and heat in other forms; the new and speedy modes of extracting the tannin from the crude bark; the newly invented instruments by which the strength of the solutions of tannin are accurately determined, &c. &c. But such is the extent of these improvements, that, whereas the tanner of thirty years ago could not afford his leather for less than six or eight cents a pound advance on the cost of the *dry Spanish hides*, the tanner of the present day can, and does afford, and does sell his leather, for an advance of from three to four cents a pound on the cost of such hides. (See table No. 1.) A large portion of this saving arises, doubtless, from the

* A full specification of the improvements connected with the tanning business, made during the last thirty years, might fill a volume. I cannot but hope that such a work may soon be compiled and published.

enlargement of the tanneries; enabling the tanner to make that division of labor among the workmen, keeping each in the constant repetition or performance of a single branch, whereby he is enabled to perform fifty per cent. more, and fifty per cent. better work than he could do if he was changed daily or hourly, from branch to branch, which, in a small tannery, is necessarily the case. I apprehend that few persons in this country have an adequate idea of the incalculable saving of labor which may be accomplished, by dividing and subdividing each branch of work, and confining each operator to a single one of the minute subdivisions. A very lucid description of this kind of economy, may be found in Adam Smith's inimitable work on the wealth of nations; a book surpassing all others in all matters of public or private economy; although it has some imperfections—or rather, the great changes since his time have rendered some portion of it inapplicable to the present day. The invention and application of these important improvements in tanning, originated chiefly with Colonel William Edwards, now of Greene county, in this state, formerly of New-Jersey, and subsequently of Massachusetts, and not unlike most other cases of great projecters and mental laborers of the human race, the benefits or profits

arising from these vast improvements of Mr. Edwards's are to the nation as millions, but to his own coffers, comparatively as units. I think I am not extravagant in rating the benefits of his improvements at millions; they have spread, and have been adopted, in some sort or measure, in all the states where leather is manufactured in any great extent; but the state of New-York, in which, by the aid of several capitalists of this city, these improvements, with the inventer, were planted and established, in 1816–17, has availed itself most largely of them; and now, besides for its own consumption, manufactures for all the other states probably one-third, may be two-fifths of all the sole leather they use. I compute the total quantity of leather, from bullock's hides, annually manufactured in our state, at twenty millions of pounds, and the leather manufactured annually in all the other twenty-five states, at thirty-five millions of pounds.

Of the history of tanning, in times gone by, I have little to say; the mere historical record is not materially useful, but to amuse the speculative and the curious. As to our own country, I believe the manufacture of leather was almost coeval with its settlement by our European ancestors, but not in sufficient quantities, even of the most necessary

and common kinds, for our own wants, until some thirty years last past. Within my memory, our annual importations of all kinds of leather have been very considerable; but the importation fifteen years ago had nearly ceased as to the more useful heavy leather, and is now chiefly confined to skins; among which are the large sheepskins of England, for which we have no adequate substitute in America. Our merino and saxon mixture of the sheep, for the improvement of the wool, has so diminished the size of that animal, that the skin is disqualified for many of its former uses. We continue, also, the importation of French calfskins largely, while we have, in my judgment, a superabundance of our own. Also, the book-binder's leather from Russia, which is said to defy the moth, from the essence, or odor, or taste, of the material used in tanning. I have no doubt we shall soon make this kind of leather in this country. I am told we have the same tanning material which is used in Russia, in abundance, in the forests of Vermont, Maine, and New-Hampshire.

The countries to which we chiefly export leather, are the Western Isles, the Mediterranean, Africa, the West Indies, South America, and largely to the Canadas. A large proportion of these exports is in the form of boots, shoes, saddles,

harness, &c. &c.; a moderate amount only going in its original form of leather. I find I have been mistaken greatly, heretofore, as to the extent of our exports of these commodities. I had supposed the value of our exports of leather, and articles made of leather, were many fold greater than I find it.* On this subject I have spent much time and pains, in examining official documents, chiefly the annual reports of the secretaries of the federal treasury, on commerce and navigation; and have compiled the several appended tables from them, (Numbers 2 and 3,) the results of which exhibit an importation, of both hides and leather, so much larger, and an exportation of both so much smaller than I had anticipated, that I have spared no pains to find some error in my work, but I find none, and am constrained to come to the very unwelcome conclusions, that, from the year 1827 to 1836 inclusive, (the official returns for 1837 not

* It is generally known, that it has been a ruling point of policy, of most, or all of the nations of Europe, to protect their domestic manufactures from the competition of others, by a very high tariff of duties, and in many cases, a total prohibition of foreign manufactures. Such was the law of Great Britain for a long period, as to leather. Subsequently it was admitted entry on paying a duty of one shilling sterling per pound; something more than the prime cost of the article in this country. Latterly, I believe, the duty has been considerably reduced. But for these high rates of duty, the tanners of the United States, with their greatly superior means of manufacture, would inundate Europe in a few years.

being yet made out,) our importations of raw hides and skins, have increased from 1,480,349 dollars, in 1827, to 3,511,463 dollars in 1836; while our exportations, during the same term, have diminished from 481,564 dollars to 459,801 dollars. I find a similar, unlooked-for and unwelcome result, in our exports and imports of leather, and articles manufactured from leather. It appears by the same official reports, for the same periods, that our importations have increased from 450,283 dollars, to 1,111,783 dollars, while our exports have decreased from 588,405 dollars to 224,832 dollars. I have said that this view of our foreign trade, in hides and leather, is an unwelcome view to me. It exhibits an annual balance against this nation, with all the world, in these articles alone, of 3,938,613 dollars, which must be paid in cash or some other commodity: and when we consider that we are largely a grazing and cattle-growing nation, manufacturing from our native hides a greater quantity of leather than any other nation of equal population, the foregoing view of exports and imports would seem to indicate an extravagant, if not a wasteful use of leather. It should furnish no special gratification, although it may form an apology for this apparent over-trading in hides and leather, that our aggregate national imports and exports, of all commodities,

during the same periods, exhibits an approximate disproportional increase of the former over the latter, as may be seen by the appended table, (number 4.) This disproportion of imports to exports, for the state of New-York, is still greater, (as may be seen by table number 5.) We are informed by Adam Smith, who has delineated every point and line of every branch of political economy; and who has, I think, collected and compressed into three volumes, more of the critical history of the individual, as well as the general economy of human society, than any one author, and with less of error and mistake than most authors; I say, we are informed by this great philosopher, *that it is characteristic with savage nations to export their raw hides, and neither to manufacture nor use much leather; while civilized nations import largely of raw hides, and manufacture and consume large quantities of leather.* It is a fair corollary, then, that our excessive consumption of leather indicates our superior degree of civilization; and such is undoubtedly the truth. The high grade of civilization of the people of the United States, is abundantly evident and universally acknowledged. But I wander from my purpose.

As respects the quantity of leather annually consumed by the people of the United States, I find it exceedingly difficult to make a satisfactory

estimate, and quite impossible to attain to any thing like accuracy. Our official data are so few, and these few annually so disqualified by our rapid and ceaseless action, and increasing domestic production and foreign trade, that all our ascertained and recorded statistical facts of one year, are falsified by the augmented productions of the next. *The irrepressible enterprize* of the people of this nation, actually mocks, flouts, and throws into utter uselessness for present purposes and calculations, the records of the diminutive production and consumption of the past.

The statistical data of the domestic productions of other countries are chiefly collected from their excise departments. But happily for us, we are free from the odious surveilance of our actions and private business concerns, which furnishes in Europe the annual, the semi-annual, and the quarterly means of recording the precise number of pounds of leather produced by each tanner. We have no exciseman's watch-box in our tanneries; we are not bound, cap in hand, to give him a schedule of every side, every skin we put in, and notice of the very hour we desire to take out each side and each skin, that he may weigh and stamp the king's tax of three pence sterling upon each pound of the produce of our labor; and we can well spare the

statistical knowledge, which must be obtained at so great a cost to our freedom.* I have therefore resorted to the only means we do possess, in my estimates of the consumption of leather in this country, which are in fact little better than guessing.† I have computed our annual consumption

* Since writing the foregoing, I find that in England the excise duty in 1812 was raised from one and a half to three pence; in 1822, reduced to one penny and a half; and totally discontinued in 1830.

† *Estimate of Leather consumed in the United States annually.* I assume that our population is about 15,000,000, equal to 3,000,000 families of five members each, and that there are annually slaughtered five bullocks to every six families; that the average weight of the hides is fifty-five pounds, yielding, when tanned, twenty-two pounds of leather, making an aggregate of 55,000,000 pounds of leather, which I value at twenty cents per pound, is $11,000,000. Our importation of foreign hides and skins exceeds the exports about $3,000,000. (*See table No.* 3.) I estimate $750,000 of this sum to be in goat, seal, sheep skins, &c., and the residue, $2,250,000 to be in hides, which, by the best data within my power, (assuming the cost abroad at $1 60 per hide,) would give us 1,406,250 hides, averaging, when tanned, twenty-five pounds of leather each, making an aggregate of 35,156,250 pounds leather, which I value at twenty cents per pound, is $7,031,250

I assume, the value of the light leather, made from foreign and domestic skins, annually consumed, in the United States, as follows:

Hog,	50,000	skins,	at $2 50	each, is	$125,000
Calf,	1,500,000	"	2 00	"	3,000,000
Goat,	1,500,000	"	75	"	1,125,000
Sheep,	4,500,000	"	33⅓	"	1,500,000
Seal,	50,000	"	2 00	"	100,000
Deer,	500,000	"	1 00	"	500,000
					$6,350,000
Add leather made of foreign hides,					7,031,250
Do. do. domestic do.					11,000,000
					$24,381,250
Add the excess of imported leather, and manufactures of leather over our exports,					886,091
					$25,267,341

of all kinds of leather at the prime cost of about twenty-five millions of dollars, which falls so much short of the estimates which have been made by others, that I should the more distrust my own calculations, but for the analagous support I find in the consumption of other countries, and particularly of Great Britain.

It appears from a late edition of M'Culloch's Dictionary of Commerce, than whom no modern author is deemed more authentic, that the total manufacture of all kinds of leather in Great Britain is 50,000,000 pounds, which he values at one shilling and eight pence sterling per pound, making £4,160,000 or $18,470,000. And he values the articles manufactured from leather at three times the cost of the leather, making say £12,500,000 or $55,500,000. He estimates the value of shoes for each individual in Great Britain, at eight shillings and six pence sterling, which for 16,000,000 people gives £6,800,000 or $30,192,000, and £5,700,000 or $25,308,000 for saddlery, &c. making a total value of $56,500,000, (excluding Scotland and Ireland.)

I am as little able to make an accurate estimate of the annual consumption, or the value of all the articles made from leather, in this country, as of the leather itself. The sum is certainly very great.

The additional labor on a portion of the commodities made from leather, would not be great, such as coarse shoes, coarse harness, the bands on the wheels of rail-road cars, the great machine bands in our large factories, &c.; but on many articles, of which leather is the entire, or in part the component material, the cost of labor is many fold the primary cost of the leather; I may name ladies' and gentlemen's *dress* shoes and boots, fine harness, and elegant furniture and carriage work.

It will be seen that M'Culloch makes the total value of the articles manufactured from leather in Great Britain, to be about threefold greater than the leather itself. His ratio is not strictly applicable in this country, as our leather costs less, and our labor in making up, much more than in Great Britain. If we should adopt his basis, and make the proper allowance for these differences, it would swell the cost of consumption for this country, of all the articles manufactured from leather, to the annual sum of eighty or eighty-five millions of dollars.*

I have intimated that statistical exhibitions may be made beneficial to the manufacturer, as well as

* From a statistical table published in Massachusetts, by the secretary of state, it appears, that the boots and shoes annually manufactured in that state alone amounted to $14,642,526.

to the merchant, the banker, or the legislator; thus, if my data be correct, that the cost of oak bark, for tanning one pound of leather, be two, or two and a half cents more than the cost of hemlock; and if the sole leather tanned with the latter be quite as good, with equal workmanship, as that tanned with the former; then, the young manufacturer, who proposes to manufacture sole leather only, or chiefly, should locate his tannery in or near the hemlock forests; so, he who proposes to tan those kinds of leather only or chiefly, which require the peculiar qualities which oak bark gives, should locate in the vicinity of oak forests.

Again, when our authentic statistical data show us satisfactorily, that the annual *increase* of our imported hides is thirteen per cent., our *increase* of imported leather fourteen per cent., and the *increase* of manufactured leather for any one great district is twenty-three per cent., while our exports are *decreasing*, as the appended tables number 1 to 6 would seem to indicate; and while the annual *increase* of our population scarcely equals five per cent., we should be admonished that something is wrong somewhere, and we should ascertain whether the *real* want and *means* of the consumers are proportionably augmented; whether the *legiti-*

mate demand keeps pace with this augmented supply. A mere *speculative* demand should not satisfy the manufacturer. An *unnatural or spurious demand* may arise from causes, not apparent at the time, and be mistaken by the manufacturer, whose mind is fully employed in his factory, for the *legitimate* demand for actual consumption. We should therefore watch carefully and suspiciously, any rapid or unusual increase in production; and nothing so well as frequent and extensive statistical views will enable us to do so. One of the most fruitful and most delusive among the causes of an *unreal and unnatural* demand for increased production of commodities, is an increase of money beyond the ordinary measure! I feel that I am approaching dangerous ground; the subject of currency having been made, most unfortunately, and I think most unwisely, the chief basis of party politics; one can scarcely speak of it latterly, without giving offence to more or less of his hearers. I desire to offend none; I make no party political allusions here; my sole purpose, in these discourses, as I have before said, is to give my feeble aid in support of the branch of business in which my life has been spent, and in the continued prosperity of which, my feelings and my pride are deeply and immoveably seated; but

I should leave my purpose unfinished, if I omit altogether a point bearing so materially on the manufacturer as that of money—*that powerful lever* in raising or lowering the market value of all things.

I think it would be very easy to demonstrate that the quantity of money (the measure of price) extant, may have quite as much influence on the price of our raw material, or on the price of our manufactured leather, and so of all commodities, as the quantity of such commodities in market has on the price. (See table number 7 and the appended note.) I am aware of the maxim, that "the ratio of supply to the demand of any commodity must rule the price." This, however, is only true while the quantity of money (the legitimate measure of price) is unvarying. But on the least variation of the quantity of money or currency, whatever may be its quality, the quoted maxim must give way. Thus, if we should double our manufacture of leather, while the quantity of medium of value remains unaltered, the price of our leather would fall greatly, probably nearly one-half; on the contrary, should we diminish our usual manufacture one-half, the supply of money remaining as usual, the price of our leather would nearly double.

Again, should the supply of both be doubled, the price of leather would remain unaltered; and

so if both should be diminished one-half, the price of the leather would remain about the same as before. It is quite obvious then, that the *profit and loss account* of the manufacturer, requires him to watch no less carefully the variations of the quantity of money than the quantity of the raw material, and the quantity of manufactured leather at market; and more especially in a trade like ours, which requires a year or more for each stock.

I believe it is now generally apprehended, that the enterprizing spirit of our city, and of our trade in common with other branches, has urged us into an excess both imprudent and unprofitable. Myself have been of this opinion heretofore, and feel the extreme delicacy of my situation in the discussion of this point. It is well known that I have expressed this opinion freely since 1830–31, as well in my business correspondence as colloquially, and almost daily, but I desire on this occasion to withhold my own judgment, and show you the records of inspections of leather, imports of hides, &c. for ten years past, desiring each individual concerned, to make up his own mind, whether we have done too much or too little. (See tables appended.) Should we, on a full and fair examination of these data, embracing also several items which I have omitted, such as stock of leather in our warehouses and tanneries, as well as the stock

of *made-up work*, so far as we can ascertain it throughout the nation; should we, I say, come to the conclusion that our trade is somewhat overdone, we shall find ample apologies to mingle with our regrets, should any arise; and first, the superior facilities which this state presents for manufacturing leather, furnish powerful inducements to extensive operations even in the most moderate and inactive business periods; but during the last seven years, while the spirit of all trades, all employments, became utterly irrepressible, our trade alone could hardly be expected to move in the rear of others. The revulsion, too, is without a parallel, it has been more sudden and more extreme than any nation has felt since 1722. We have moreover the substantial consolation, that the sudden and great diminution of consumption of leather, consequent on the revulsion, cannot last long, for whatever the people may be compelled to dispense with of luxuries or comforts, through their diminished means and deranged employments, they cannot dispense with the use of an article of such absolute necessity as sole leather, nor can they much diminish the quantity ordinarily consumed; so that if our stocks in store, and in the tanneries, be not overswollen, and especially if we suitably diminish our manufacture during the present year,

our trade will ultimately return to a sound and healthful state.

Again, I say, if from our data and reasoning we should come to the conclusion that we have enlarged our stocks of leather beyond the legitimate wants of the nation; if we should ascribe such excess to the indiscreet erection or enlargement of the capacity of our tanneries for several years past, or to the enlargement of that potent and all-pervading instrument of trade, our circulating medium, let us adopt the best remedies within our power, let us act like reasonable men, let us not fly into the opposite extremes, let us not resort to remedies worse than the disease: It would be hardly creditable to this enlightened nation to demolish its institutions because they have done too much. It would be hardly creditable to the discretion and good sense of a tanner, to tear down or destroy his whole tannery, because, inadvertently, or even from inordinate love of gain, he has made it too large; let us not abjure our trade, and all go bare-foot, because we have overdone it. Such a course would render us more ridiculous in the eyes of the community, than the gormandizer who abjured roast beef for ever, because, for once, his gluttony got the better of his discretion.

TABLES.

I.

Showing the average nett value, or price, per pound, of Hemlock Sole Leather, sold by G. Lee & Co. during the following years, exclusive of commissions and charges:

1827,	17½	cents per pound.
1828,	18½	" "
1829,	18½	" "
1830,	18½	" "
1831,	19½	" "
1832,	17¼	" "
1833,	15¾	" "
1834,	13¾	" "
1835,	14¾	" "
1836,	17¼	" "
1837,	16	" "

Note. The average price for the whole eleven years, is about seventeen cents; for the last six years, fifteen and five-sixths cents. It may be well to note also, that the statutes of this state, regulating the inspection and sale of sole leather, require the inspector carefully to examine, and weigh, and stamp on each side, the weight and grade of quality, such as *best*, *good*, *damaged*, *bad*; and the penalties are severe for any violation of the statutes. The price of the several grades, composing each invoice, varies from six to twenty cents a pound. Each of the items of the foregoing table, embraces leather of every price, from six to twenty cents or more.

LEATHER.

II.

Showing the Value of all kinds of Leather, and of all kinds of articles manufactured from leather, imported into and exported from the United States, during the years 1827 to 1836, inclusive, closing each year on the 30th September. Compiled from the Secretary of the Treasury's Annual Reports of the Commerce and Navigation of the United States.

	IMPORTS.	EXPORTS.
1827,	$450,283	$588,405
1828,	496,970	542,266
1829,	549,113	496,830
1830,	506,298	456,304
1831,	826,073	398,336
1832,	670,016	363,696
1833,	860,795	301,095
1834,	688,600	239,850
1835,	1,047,367	313,346
1836,	1,111,783	224,832

HIDES.

III.

Showing the value of raw Hides and Skins imported into and exported from the United States during the years 1827 to 1836 inclusive, closing each year on 30th September. Compiled from the Secretary of the Treasury's Annual Reports of the Commerce and Navigation of the United States.

	IMPORTS.	EXPORTS.
1827,	$1,480,349	$481,564
1828,	1,804,203	432,667
1829,	2,252,609	527,294
1830,	2,409,850	510,658
1831,	3,057,543	326,767
1832,	4,680,128	920,746
1833,	3,588,819	805,129
1834,	3,296,688	1,644,965
1835,	3,369,888	191,074
1836,	3,511,463	459,801

COMMERCE OF THE UNITED STATES.

IV.

Showing the value of the total imports and exports, into and from the United States, during the years 1827 to 1836, inclusive, closing each year on 30th September. Compiled from the Secretary of the Treasury's Annual Reports of the Commerce and Navigation of the United States.

	IMPORTS.	EXPORTS.
1827,	$79,484,068	$82,324,827
1828,	88,509,824	72,264,686
1829,	74,492,527	72,358,671
1830,	70,876,920	73,849,508
1831,	103,191,124	81,310,583
1832,	101,029,266	87,176,943
1833,	108,118,311	90,140,433
1834,	126,521,332	104,346,973
1835,	149,895,742	121,693,577
1836,	189,980,035	128,663,040

COMMERCE OF THE STATE OF NEW-YORK.

V.

Showing the value of the total imports and exports, into and from this state, during the years 1827 to 1836, inclusive, closing each year on the 30th September. Taken from the Secretary of the Treasury's Annual Reports of the Commerce and Navigation of the United States.

	IMPORTS.	EXPORTS.
1827,	$38,719,644	$23,834,137
1828,	41,927,792	22,777,649
1829,	34,743,307	20,119,011
1830,	35,624,070	19,697,983
1831,	57,077,417	25,535,144
1832,	53,214,402	26,000,945
1833,	55,918,449	25,395,117
1834,	73,188,594	25,512,014
1835,	88,191,305	30,345,264
1836,	118,253,416	28,920,638

SOLE LEATHER INSPECTED IN NEW-YORK.

VI.

Showing the total number of sides of Sole Leather inspected in the city of New-York, during the years 1827 to 1837, inclusive.

1827,	265,553	sides.
1828,	284,978	"
1829,	264,878	"
1830,	326,298	"
1831,	440,000	"
1832,	667,000	"
1833,	882,609	"
1834,	828,175	"
1835,	784,165	"
1836,	925,014	"
1837,	890,962	"

REAL AND PERSONAL ESTATE OF THE CITY OF NEW-YORK.

VII.

The Assessed Official Value.

	REAL.	PERSONAL.	TOTAL.
1827,	$72,617,770	$39,594,156	$112,211,926
1828,	77,139,880	36,879,653	114,019,533
1829,	76,834,880	35,691,136	112,526,016
1830,	87,603,580	37,684,938	125,288,518
1831,	97,221,870	42,058,344	139,280,214
1832,	104,042,405	42,260,213	146,302,618
1833,	114,124,566	52,366,976	166,491,542
1834,	123,249,280	63,299,231	186,548,511
1835,	143,732,425	74,991,278	218,723,703
1836,	233,742,303	75,758,617	309,500,920
1837,	196,450,109	67,297,241	263,747,350

Note. It can scarcely be possible that the city has actually added to its present wealth, $151,535,424 within eleven years, over and above its annual expenditures, which, at one hundred dollars for each individual would amount to $22,500,000 for one year, or $247,500,000 during ten of the eleven years of the table. To what cause then can we ascribe this apparent increase, but to an inordinate enlargement of the measure of value? And to what cause can we ascribe the fall of nearly fifty millions the last year, but to the diminution of that measure?

HIDES—NEW-YORK.

VIII.

Showing the number of Hides imported into and exported from the port of New-York, during the years 1827 to 1837 inclusive, closing each year on 31st December. Taken from Shipping and Commercial Lists and Customs.

	IMPORTS.	EXPORTS.
1827,	259,975 hides.	41,545 hides.
1828,	268,744 "	48,369 "
1829,	308,987 "	52,023 "
1830,	475,640 "	26,305 "
1831,	772,299 "	8,017 "
1832,	975,094 "	169,493 "
1833,	892,198 "	58,282 "
1834,	700,052 "	169,856 "
1835,	868,381 "	21,903 "
1836,	942,890 "	109,273 "
1837,	623,925 "	99,356 "

HIDES—LIVERPOOL.

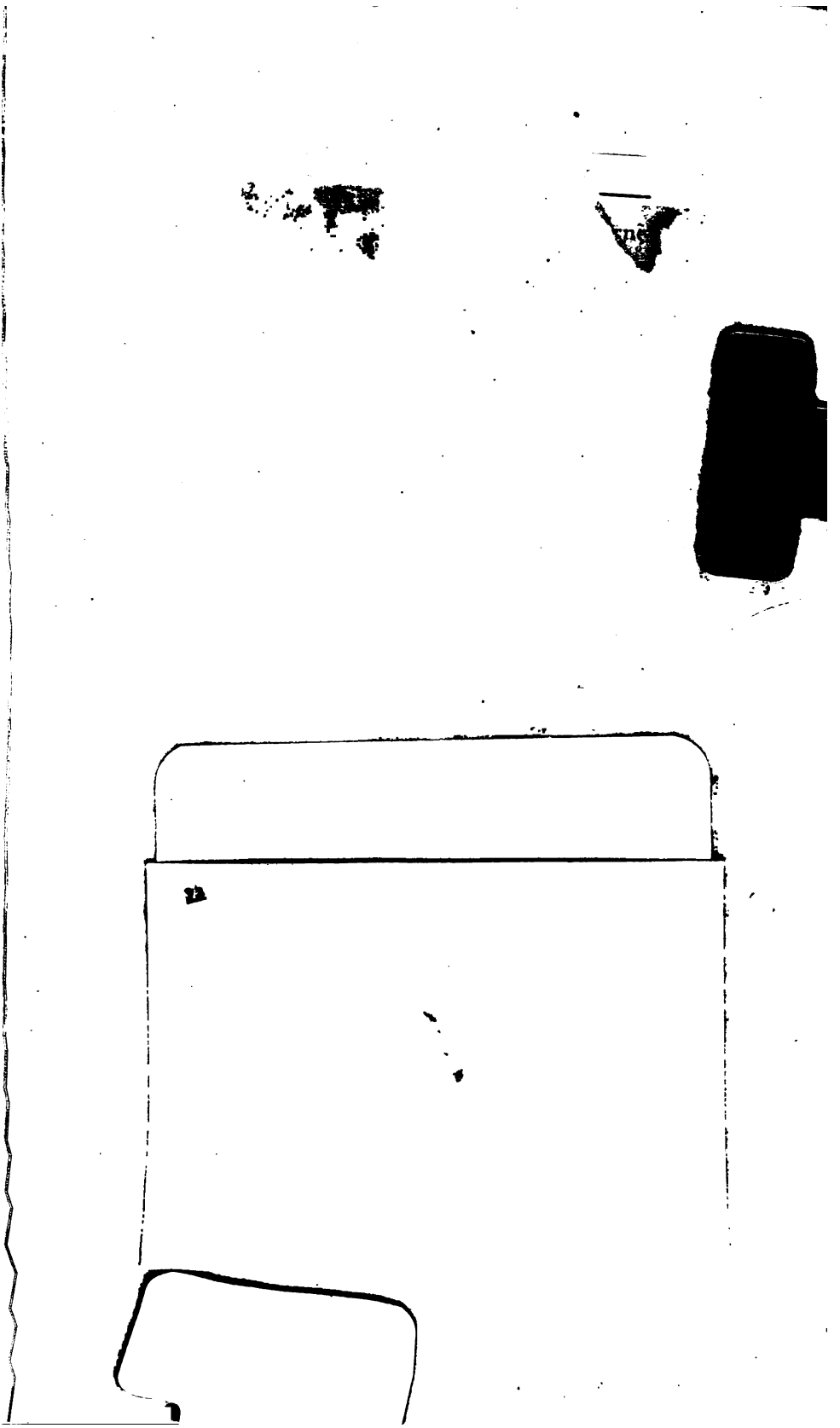
IX.

	IMPORTS.	EXPORTS.
1827,	186,127 hides.	29,001 hides.
1828,	290,512 "	30,880 "
1829,	542,411 "	128,449 "
1830,	514,260 "	170,604 "
1831,	564,859 "	138,220 "
1832,	351,897 "	111,450 "
1833,	692,419 "	62,000 "
1834,	626,189 "	213,855 "
1835,	682,141 "	337,444 "
1836,	479,107 "	198,277 "
1837,*	477,820 "	166,930 "

Note. This table is compiled from the printed commercial circulars of Liverpool houses, and is inserted here merely to show the comparison of that city and this, in the trade of foreign hides. Liverpool far exceeds any other city in the world in the hide trade, except the city of New-York. I regret that there will still be this imperfection in the comparison, that this table embraces horsehides as well as bullocks, the last five years only, whereas the table for New-York embraces them for the whole time.

* Ten months only.

Mercein & Post's Press.



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